

Convergence of Wholesale And Retail Markets: The Texas Experience

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ERCOT's Footprint

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- ERCOT is NOT synchronously interconnected to any other grid; only connected through 5 DC ties ranging from 36 MW to 600 MW capacity and totaling 1,106 MW. There are two additional ties of 1,500 MW and 3,000 MW under development for up to an additional 4,500 MW.
- ERCOT Region - \$32B electric market that covers 75% of Texas land region and 85% of the state's load.
- ERCOT has 41,500+ miles of transmission lines.
 - Loads pay for the transmission system (including all additions) based on a pro rata share of coincident peak load.
- Peak load 68,305 MW on August 3, 2011.
- Total number of generating units: 550+.

ERCOT's Footprint (cont'd)

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- Total market participants: 1,100+
- Total Qualified Scheduling Entities (QSE): 402 as of the end of May 2014, with 104 representing neither load nor generation, 170 representing load, 82 representing generation and 46 representing both load and generation. Three QSEs represent distributed generation (DG) as emergency response service (ERS) generators.
- Total generation for 2013: 331 million MWh
 - 73% competitive.
 - 16% municipalities.
 - 12% cooperatives.
- 98% of energy is settled in 15 minute intervals through data from AMI or IDR meters (as of May 31, 2014).
- As of June 1, 2014 loads can bid into SCED.
 - None as of yet (expect 3 QSEs to begin bidding their load into SCED later this month).

ERCOT Wholesale and Retail Markets Designed To Operate As A Unified Whole

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“The Texas electricity wholesale and retail markets were designed at the onset as a unified whole to support the development of efficient markets in each.”

“Texas’ wholesale market was designed in conjunction with its retail market, with an array of policies put in place to ensure that market participants would have access to systems and facilities needed to participate in the market. Three aspects of the market design – tied to unbundling and divestiture, transmission access and cost-allocation, and market administration – are notable in this regard.”

“Texas designed its power market with the customer as its focal point ... Customer choice is considered both a right and responsibility, in ways more akin to the expectations of customers in other types of markets than in traditional electric service arrangements provided by monopoly utility companies.”

- Susan F. Tierney, Ph. D. *ERCOT Texas’ Competitive Power Experience: A View from the Outside Looking In*, October 2008.

The Texas Approach to Markets

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- In Texas, ERCOT has both wholesale and retail responsibilities.
 - System reliability – planning and operations.
 - Open access to transmission.
 - Wholesale
 - Schedules and dispatches.
 - Manage both real time and day ahead markets.
 - \$11.2 billion (2013) real time market
 - \$11.3 billion (2013) day ahead market
 - \$505 million (May 2013-Apr 2014) congestion revenue rights
- Retail
 - Manages switching customers between retail electric providers (REPs).
 - Handles billing.
 - Meter reads come in to ERCOT.
 - ERCOT provides customers usage data to the respective REP.

ERCOT's Distributed Generation And Cogeneration

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- 4.7 GW currently is expected to be available to ERCOT from Private Use Networks (PUN) when system conditions indicate scarcity.
 - As new system wide offer cap and operating reserve demand curve create prices as high as \$9,000/MWh, ERCOT expects to see this figure climb.
- ERS traditionally was a DR product, however ERCOT now has several providers of DG which participate in ERS by bidding in generation.
 - In ERCOT, 10 MW or greater generation has to register as wholesale, less than 10 MW doesn't.
 - DG providers can tie into the grid at the distribution or transmission level and be designated a "Small Generator" if less than 10 MW is connected at a particular location.
 - For example, one DG provider distributes small packages (each about 9.5 MW) of DG around the state, effectively aggregating over 150 MW of DG. The aggregated total is then bid into ERS - Generation participating in what traditionally has been a load based service.

ERCOT's Demand Response

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- **Two sub-categories of DR**
 - ERS and Load Response Service are loads procured and deployable by ERCOT as emergency reserves and an ancillary service.
 - Price responsive DR
 - Pure market driven activity: currently loads managing their consumption to arbitrage market price differences, manage high prices and, where applicable, transmission cost allocation. Ultimate goal: retail customers actively and transparently participating in the market through bidding their load into SCED.
 - In their June 2012 report, Brattle estimated there was at least 1,700 MW of load that responded to scarcity pricing during Texas' August 2011 extreme weather event.
 - In a recent 2014 report, Brattle projects that DR could grow an additional 2,300 MW to 3,800 MW. (Exploring Natural Gas and Renewables in ERCOT, June 3, 2014)
- **Example of Price Responsive Demand Response (Snapshot from June 2013)**
 - 156,000 total retail customers enrolled, including:
 - 117,000 Time of Use
 - 4,100 Real-Time Pricing
 - 23,000 Block & Index
 - 1,900 Peak Rebate
 - 10,000 "Other Direct Load Control"

Examples of DR Programs Offered in ERCOT

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- Two examples of REP programs :
 - City Public Service (CPS - San Antonio's municipal utility) DR program – 50kw load (can be aggregated), CPS's goal is to have 771 MW available for curtailment by 2020.
 - REP Reliant Energy's NEST thermostat program (2 year sign up), and Reliant Energy is now offering \$0.80/kwh without regard to customers current plan, the only requirement is a smart thermostat.

- What effect will these types of programs have?

Where Does DG End and DR Begin?

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- What happens if a micro gas turbine becomes cost effective for individual consumers?
- For example, the following scenario is not inconceivable: What if a REP were to lease micro generators to their customers, with the control technology to start the micro generators remotely, in exchange for volumetric payments to the customers? Has the REP effectively become a generator?
- Is this the complete circle of convergence of the markets when the retail (including residential) consumer becomes a wholesaler of system resources?
- If so, will retail customers still need REPs? Will retail customers have to register as a REP or QSE or both? (I can guarantee that ERCOT doesn't need 6 million REPs or QSEs.) What would be the effect on the transmission and distribution system and the current cost recovery methodology?

Contact Information

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